

areas seems, from our own knowledge, to hold good. Whether sea-fish hatching will prove successful in the future time will show, but the Dunbar Hatchery has not altogether been prosperous. Let us hope the new hatchery at Nigg Bay, Aberdeen, will flourish, with best wishes to its active promoter and superintendent.

PROCEEDINGS OF LEARNED SOCIETIES.

GEOLOGICAL SOCIETY.

February 22nd, 1899.—W. Whitaker, B.A., F.R.S.,
President, in the Chair.

The following communication was read:—

‘Remarks on the Genera *Ectomaria*, Koken, and *Hormotoma*, Salter; with Descriptions of the British Species.’ By Miss Jane Donald.

This paper deals with some of the genera into which the family of the Murchisoniidae has been divided, and confines itself to the established genus *Hormotoma*, Salter, and the new genus *Ectomaria*, Koken, which contain some of the oldest known species of elongated gasteropoda. Both forms are distinguished from the typical *Murchisonia* by merely possessing a sinus in the outer lip, instead of having a deep narrow slit with parallel edges; the lines of growth also retreat towards, and advance from, the sinus more obliquely. The Author prefers to separate the elongated shells from the shorter Pleurotomariidae, as Koken does, and to let the former constitute the family Murchisoniidae.

The genera are described, with two new species of *Ectomaria* and two new varieties of *Ectomaria pagoda*, Salt. Six new species of *Hormotoma* are also described, together with the species *H. Salteri*, Ulrich & Scofield, *H. gracillima*, Salt., *H. cingulata*, His., and *H. articulata*, Sow. The species of *Ectomaria* are all derived from the Cambrian and Ordovician rocks of Scotland, and the species of *Hormotoma* from various beds, ranging from the Durness Limestone to the Upper Ludlow rocks. An account of the distribution of the genera over Europe and America is also given.

March 8th, 1899.—W. Whitaker, B.A., F.R.S.,
President, in the Chair.

The following communication was read:—

‘An Analysis of the Genus *Micraster*, as determined by rigid Zonal Collecting, from the Zone of *Rhynchonella Cuvieri* to that of *Micraster cor-anguinum*.’ By Dr. A. W. Rowe, F.G.S.

The Author has endeavoured to show, by means of rigid zonal collecting on a large scale, from the White Chalk of the Southern and
Ann. & Mag. N. Hist. Ser. 7. Vol. iii. 31

South-eastern coast-sections of England, that the genus *Micraster* is one and the same form gradually evolving from the more simple to the more complex. In doing this, he also contends that the genus may be divided into definite groups, each or several of which are absolutely diagnostic of the various Chalk zones, as defined by Barrois. The conclusions arrived at point to the regular and continuous deposition of the White Chalk, and strikingly confirm the general accuracy of Barrois's zoning.

The paper gives a minute comparison and description of the genus *Micraster* from a general point of view, and from that of a group, and deals particularly with the essential details of the test of the especial groups characteristic of each zone. The Author claims that, so far as *Micraster* is concerned, each zone is marked by a definite facies of essential characters of the test, which are purely horizontal, and that all species and varieties, however divergent they may apparently be, occurring at any given horizon, are stamped with the impress of these marked horizontal features.

The Author proves that, while in an isolated instance, one may be unable to decide the horizon in the White Chalk whence a specimen of *Micraster* was derived, in the ninety-nine other cases the diagnostic features described by him point unerringly to the exact horizon, and thus afford a valuable aid to stratigraphical geology, especially as the essential zonal features of the test are easily made out in the field.

The Author discusses the four groups into which the species of *Micraster* in these zones may be placed, and describes in detail the species in these groups.

The paper is illustrated by photographs, micro-photographs, and lantern-slides.

April 12th, 1899.—W. Whitaker, B.A., F.R.S.,
President, in the Chair.

The following communications were read:—

1. 'Fossils in the University Museum, Oxford: I. Silurian Echinoidea and Ophiuroidea.' By Prof. W. J. Sollas, M.A., LL.D., D.Sc., F.R.S.

Attention is called to the correlation of structure and function in the locomotive organs of Asterids, Ophiurids, and Echinids. In the case of the two latter, movement depends on tension directed along the tube-feet. In starfishes this tension is met by the disposition of the ambulacral ossicles in the form of an arch: in urchins by a continuous tessellation of the surface, which would only be weakened by arch-like interruptions. If, however, urchins have been evolved from an Asterid stem, they may have originally possessed arch-like ambulacral grooves, and the present plates of the ambulacra may have been subsequently acquired. In *Palæodiscus ferox* of the Lower Ludlow, Leintwardine, which by the structure of the buccal armature is definitely shown to

have been an Echinid, the ambulacra possess just such characters as theory anticipates: an inner arch of poriferous ambulacral plates, homologous with those of a starfish, is closed externally by a series of paired plates, which represent the ambulacral series of an urchin.

The undoubted Asteroid affinities of the urchin lead to an attempt to find homologies for the elements of 'Aristotle's Lantern': the pyramids are regarded as equivalent to the first pair of adambulacral plates, the epiphyses to the corresponding pair of ambulacral plates of the Echinoid series, and the teeth are compared to the Asteroid odontophore, which has acquired a persistent root.

A new genus assigned to the Echinida is characterized by the excessively numerous minute plates which form the interambulacra. Reference is made to *Echinocystis pomum*, WYV. Thomson; and to a species of *Protocidaris*, Whidborne, from Lower Ludlow beds, which seems to be identical with the type-species found in Devonian rocks.

The results are given of a re-examination of the unique specimen on which Dr. H. Woodward founded the genus *Eucladia*. The Author agrees with Dr. Woodward in regarding the exposed surface of this fossil as ventral; it bears the buccal armature and madreporite, and gives origin to the arms. On slicing two of the arms, no plates were exposed which it was possible to certainly identify with vertebral ossicles. Some hollow casts, from the Lower Ludlow of Leintwardine, which have hitherto been regarded as too problematical for determination, are shown to represent an organism closely allied to *Eucladia*, and are provisionally referred to that genus. The number of arms in this new species is less than in the original (*E. Johnsoni*), and they are more nearly equal in size. A new genus, closely allied to *Eucladia*, is founded on a small, well-preserved specimen from the Wenlock Limestone of Croft Farm. In this the pairs of arms of each paired series are only two in number, while in the new species of *Eucladia* at least four, and in *E. Johnsoni* as many as seven are present. *Eucladia* and the new genus are regarded as aberrant Ophiurids, and are placed in a new order as a group of the same value as the Euryalæ. They are defined as Ophiurida possessing paired series of arms, covered externally by imbricating plates, but devoid of ambulacral ossicles. The buccal armature is abnormal.

2. 'Note on the Occurrence of Sponge-spicules in the Carboniferous Limestone of Derbyshire.' By Prof. W. J. Sollas, M.A., LL.D., D.Sc., F.R.S.

Remains of sponge-spicules are fairly abundant in a rock-slice taken from a specimen obtained by Mr. H. H. Arnold-Bemrose from Tissington cutting. They present themselves as sections through long cylindrical rods, but the terminations are obscure and indefinite, and the form cannot be referred with certainty to any recognized order of Sponges. The spicules were doubtless originally siliceous,

but they are now completely transformed into carbonate of lime. Rhombohedra of calcite appear to have completed their growth as readily within the spicule as outside it, and the final result of the corrosion is to entirely replace the opal of the spicule by a congeries of minute crystals of calcite. As the crystals may have begun their growth outside the spicule, the latter rarely preserves its characteristic regular outlines. The crystals being frequently bounded by impurities of the limestone, the spicules are often as clearly defined as corresponding structures in the Chalk.

MISCELLANEOUS.

A Note on the Date of the Parts of 'Humboldt and Bonpland's Voyage: Observations de Zoologie.'

THIS book was issued in livraisons as follows:—

Vol. I., livr. 1,	pp. 1-46 (& 47, 48),	1805,	forming pp. 1-25 of 2nd issue.
2,	-104,	1807,	26-64 "
3,	-196,	1807,	65-126 "
4,	-293,	1809,	127-200 & 253-259 of 2nd issue.
5 & 6,	-412,	1809,	261-297 & 201-252 & 298-309 of 2nd issue.

A break then occurred until 1812, when livraison 7 was issued, with the following "Avis" on a loose slip of paper:—"Avec cette Livraison, qui terminera le premier volume des Observations de Zoologie et d'Anatomie comparée, on fournit aux Abonnés un nouveau texte pour la totalité de ce volume. On a cru devoir faire ce sacrifice, afin que cet ouvrage ressemblât, pour le caractère et le papier, à toutes les autres parties du Voyage de M. de Humboldt. Les Acquéreurs pourront faire relier ce volume; ils rendront tout le texte des livraisons précédentes, dont il ne conserveront que les planches." Fortunately for nomenclature the British Museum (Natural History) secured some years ago a parcel of odd parts, which prove to be a complete set of the first issue; these are properly cared for, and are of considerable interest.

The completion of the work dates as follows:—

Livr. 7,	pp. 305-368 (with reprint of pp. 1-412 of 1st issue, forming pp. 1-309 of 2nd issue),	1812 (T.P. dated 1811).
Vol. II., livr. 8,	1-64,	1813.
9,	-96,	1813.
10,	-144,	1817.
11, }	-224,	1821.
12, }	-256,	1821.
13,	-256,	1827.
14,	-352,	1832 (T.P. dated 1833).

C. DAVIES SHERBORN
(*'Index animalium'*).